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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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EXAMINER

BULLOCK JR, LEWIS ALEXANDER

ART UNIT PAPER NUMBER

2195

DATE MAILED: 09/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/942,611

Applicant(s)

TANAKA ET AL.

Examiner

Lewis A. Bullock, Jr.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 25-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 25-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims 25, 26, 29, 30, 33 and 34 are rejected under 35 U.S.C. 102(a) as being anticipated by “Cellular Disco: Resource Management Using Virtual Clusters on Shared-Memory Multiprocessors” by GOVIL et al.

As to claims 25, 29 and 33, GOVIL teaches a virtual computer system comprising: a plurality of virtual computers (virtual machines) operating on a physical computer having one or more CPUs (CPUs) and a main memory device (memory); a hypervisor (pg. 233-234, The Cellular Disco Architecture, “Cellular Disco is a virtual machine monitor that can execute multiple instances of an operating system by running each instance inside its own virtual machine...For each newly created virtual machine, the user specifies the amount of resources that will be visible to that virtual machine by indicating the number of virtual CPUs, the amount of memory, and the number and type of I/O devices...Cellular Disco allocates the actual machine resources to each virtual machine as required by the dynamic needs and the priority of the virtual machine, similar to the way an operating system schedules physical resources based on the needs and the priority of user applications.”); ; a storing section for storing contents of a plurality of actions for changing physical resources allocated to virtual computers judged

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as having high loads by a load monitor which monitors load conditions of the virtual computers (pg. 238, CPU Management, "A load-balancing scheme is used to avoid the situation in which one portion of the machine is heavily loaded while another portion is idle. The basic load-balancing mechanism implemented in Cellular Disco is VCPU migration...VCPU migration is used by a balancing-policy module that decides when and which VCPU to migrate, based on the current load of the system and on fault containment restrictions."); see also pages 245 – 250 for balancing the workload CPUs and memory over virtual machines); and means for implementing the plurality of actions sequentially and for conducting physical resource allocation according to contents of the actions that are effective in lowering loads of the virtual computers (pg. 238, CPU Management, "A load-balancing scheme is used to avoid the situation in which one portion of the machine is heavily loaded while another portion is idle. The basic load-balancing mechanism implemented in Cellular Disco is VCPU migration...VCPU migration is used by a balancing-policy module that decides when and which VCPU to migrate, based on the current load of the system and on fault containment restrictions."); see also pages 245 – 250 for balancing the workload CPUs and memory over virtual machines), wherein the hypervisor comprises: the load monitor for monitoring load conditions of the virtual computers based on load conditions of the main memory device (pg. 238, CPU Management, "A load-balancing scheme is used to avoid the situation in which one portion of the machine is heavily loaded while another portion is idle. The basic load-balancing mechanism implemented in Cellular Disco is VCPU migration...VCPU migration is used by a balancing-policy module that decides when

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and which VCPU to migrate, based on the current load of the system and on fault containment restrictions.”; see also pages 245 – 250 for balancing the workload CPUs and memory over virtual machines), a reallocation section for dynamically changing allocation of physical resources to the virtual computers(pg. 238, CPU Management, “A load-balancing scheme is used to avoid the situation in which one portion of the machine is heavily loaded while another portion is idle. The basic load-balancing mechanism implemented in Cellular Disco is VCPU migration...VCPU migration is used by a balancing-policy module that decides when and which VCPU to migrate, based on the current load of the system and on fault containment restrictions.”; see also pages 245 – 250 for balancing the workload CPUs and memory over virtual machines), and a controller for controlling physical resource allocation to the virtual computers based on load conditions obtained by the load monitor, and for demanding reallocation in response to an output from the reallocation section (pg. 238, CPU Management, “A load-balancing scheme is used to avoid the situation in which one portion of the machine is heavily loaded while another portion is idle. The basic load-balancing mechanism implemented in Cellular Disco is VCPU migration...VCPU migration is used by a balancing-policy module that decides when and which VCPU to migrate, based on the current load of the system and on fault containment restrictions.”; see also pages 245 – 250 for balancing the workload CPUs and memory over virtual machines).

As to claims 26, 30, and 34, GOVIL teaches the load monitor collects load data corresponding to load conditions of at least one of the virtual computers with a fixed interval, and detects periodic changes of the collected load data, and wherein the controller demands the physical resource allocation based on the periodic changes of the collected load data, and demands periodical allocation of physical resources to the reallocation (via an periodic balancer that after each node updates the load tree tracks the load of the entire system, the periodic balancer traverses this tree, checking for load disparity such that VCPUs are migrated from highly loaded systems to lower loaded systems) (see page 246-247).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 27, 28, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Cellular Disco: Resource Management Using Virtual Clusters on Shared-Memory Multiprocessors" by GOVIL et al. in view of KAUFFMAN (U.S. Patent 6,633,916).

As per claims 27 and 31, Kauffman teaches the invention as claimed, including a virtual computer system according to claims 1, 8, and 13, wherein said controller decides a priority order of allocation of physical resources to each virtual computers in response to the output from said reallocation section according to information of customers using the virtual computers and agreement conditions with the customers (col. 2 line 28 - col. 3 line 4, "LPARs...can respond to changes in load dynamically...in several ways"). Therefore, it would be obvious to combine the teachings of GOVIL with the teachings of KAUFFMAN in order to facilitate scalability and high performance in the assigning of resources to partitions without rebooting the system (col. 4, lines 46-61).

As per claims 28 and 32, Kauffman teaches the invention as claimed, including a virtual computer system according to claims 23, 27, and 31, wherein said controller uses a reference value to judge an overload condition for each virtual compute, the reference value indicating according to the customers and agreement conditions an amount of load permitted for the virtual computer (col. 2 line 28 - col. 3 line 4, "LPARs...can respond to changes in load dynamically...in several ways"). Therefore, it would be obvious to combine the teachings of GOVIL with the teachings of KAUFFMAN in order to facilitate scalability and high performance in the assigning of resources to partitions without rebooting the system (col. 4, lines 46-61).

Response to Arguments

5. Applicant's arguments with respect to claims 25-34 have been considered but are moot in view of the new ground(s) of rejection.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lewis A. Bullock, Jr. whose telephone number is (571) 272-3759. The examiner can normally be reached on Monday-Friday, 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

September 5, 2006


LEWIS A. BULLOCK, JR.
PRIMARY EXAMINER